<u>Specification page 8 line 44</u>

The particular indexer 50 disclosed has a rotating drive system including a motor, a positioning sensor and a control system (within the indexer; thus not shown). The rotating drive system of the indexer 50 is designed to preliminarily locate the parts in an indexed position, in the particular embodiment disclosed with the later described grinding wheel ~~50~~ <u>40</u> over the center of a rotor valley 32.

Specification page 9 line 16

The indexer 50 in addition includes a key drive 55 that selectively engages a key 29 on the arbor 20 in order to initially position the parts to be ground in respect to the grinding apparatus 10. In the preferred embodiment disclosed, this indexer key is engaged during rotary indexing movement of the arbor, with it being subsequently being disengaged during the actual grinding operations. With this separation of the rotating indexing function from the clamped grinding function, there is no interference between the two. Thus the ability of the later described fixture 80 to precisely locate the rotors 30 in respect to the grinding wheel ~~50~~ 40 is not compromised. Alternately, the key drive could be lost motion and/or have a sufficient degree of resiliency (i.e., rubber, synthetic, springs, etc. between the two) such that the continual engagement thereof would not compromise the accuracy of the clamped grinding position of the rotor stack.

Specification page 12 line 50

In the preferred embodiment, the part contact is also substantially lateral of the main forces developed during the manufacturing operation. This causes such main forces to be transferred efficiently through the fixture 80 to a solid support member. In the preferred embodiment, these forces are on an engagement angle substantially perpendicular to the base 87 upon which the fixture 80 resides (i.e., in line with the rotational axis of the grinding wheel ~~50~~ 40). This efficient transfer is facilitated by the location of the actual support (the later described positioning rolls) substantially in line with the manufacturing forces. Both add to the repeatability and longevity of maintaining the desired tolerances in the device. Further, the fixture 80 extends in contact with each manufactured part, thus individually locating such part along with the other parts.

Specification page 14 line 28

In the preferred embodiment, the rolls 84, 85 are directly opposed to each other with one roll 84 being located adjacent to the grinding wheel ~~50~~ 40 with the other 85 located near to the valley directly opposite the grinding wheel. The former encourages the use of a previously ground rotor valley as a reference (for example by indexing the rotor one valley counter clockwise or three valleys clockwise in fig. 2). The latter provides for a support for the rotor during the grinding operation without the complications of a fixture movement into the valley directly opposed to the grinding wheel; a position necessitating a vertical movement of the arbor 20 and/or the fixture 80.

Specification page 16 line 50

Note that in the preferred embodiment, the rotors have cutaway external surfaces. With this type of surface, the outer surface of the rotor 30 deviates from an exact developed surface by eliminating non-essential areas called cutaways in order to increase the overall efficiency of the resultant gerotor structure and its valving (see U.S. Patent 4,859,160 previously set forth). For this type of structure, it is preferred that the contact points 37, 38 be spaced from the rotor valley 36 while remaining within the main lines of action 39 for the stator roll neighboring the top dead center roll of a gerotor set. The former provides for a two point contact while the latter insures that the points of contact will be useful in the operation of the subsequently assembled gerotor set. The oversized positioning roll also shifts at least one point of contact (37 in fig. 4) more towards the centerline plane of the grinding wheel ~~50~~ 40, thus allowing for a more efficient transfer of force to the fixture 80. A location within the cutaways of the rotor is not preferred due to the higher and varying tolerances thereat. Note that a particular rotor's continuation of developed shape beyond a main line of action would provide additional room for positioning roll contact thereat.

Specification page 19 lines 10, 28, 32, 40

The grinding apparatus 10 is utilized to finish grinding the outside surface of the rotors 30 located in sets on the arbor 20. This grinding occurs through a Cubic-Boron-Nitride (CBN) grinding wheel ~~50~~ 40 shaped into the final shape of the rotors 30. In the particular embodiment disclosed, this shape extends from at least the centerline of adjoining rotor lobes 31 across one included rotor valley 32. This ensures the grinding of the entire surface of the rotors 30. In the preferred embodiment shown, the grinding wheel shape extends slightly beyond the centerline so as to facilitate merging adjoining grinds. This also allows for some minor finished size adjustment by moving the axis of the grinding wheel ~~50~~ 40 differentially in or out in respect to the axis of the rotors. This adjustment can be used to compensate for wear on the grinding wheel ~~50~~ 40 as well as allowing for the manufacture of oversized and/or undersized rotors in a single machine.

To accomplish the grinding operation, the CBN grinding wheel ~~50~~ 40 is positioned in contact with the stack of rotors 30 and moved longitudinally of the stack while the CBN grinding wheel is in contact with the rotor. This finish grinds the surface of the rotor.

Specification page 22 line 52

After the first production (1) valley 32 is ground, the grinding wheel ~~50~~ 40 is disengaged from the rotors and the fixture 80 moved out of contact with the rotors 30 (step 240). If less than the entire rotor 30 has been ground, the indexer 50 indexes the rotors and the process repeated (step 250). In the preferred embodiment herein, the second production grind (2) is located such that both reference grinds (A, B) are again in contact with both rolls 84, 85 respectively. The rotors on the mandrel 20 are thus indexed 180^{o} from the first production grind (1), effectively reversing the contact of the positioning rolls in respect to the reference grinds. The third (3) and fourth (4) production grinds use the first two production grinds (2, 3) to clamp the rotors by the rolls, again indexing one valley counterclockwise for the third (3) and 180^{o} additional for the fourth (4) production grind. This process then repeats with each pair of opposing production grind serving to clamp the rotors for the following two production grinds. Note that as previously set forth, it is further preferred to use the last set of production grinds (5, 6) to touch up the reference grinds (A, B) in a final production grinding operation (7, 8), thus to cause a common standard of the production grinds tolerances for the entire rotor. Note that as previously set forth, the two point contacts in

combination with the diagonal clamping motion prevent the rotor stack from rotationally slipping during this final grinding operation. This avoids problems that might occur if a smaller grind (a production grind) was to be utilized as a clamping reference for the final touch up of the initial reference grind (i.e., a slight clockwise shifting of the rotor stack is avoided during this final operation).